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Knowledge, Attitude and Practice of Hand Hygiene among Healthcare Providers in Semi-urban Communities of Sokoto State, Nigeria

**Umar M. Ango^{1*}, Kehinde J. Awosan¹, Habibullahi Adamu¹,
Shamsudeen Salawu¹, Musa M. Sani¹ and Asma'u H. Ibrahim¹**

¹Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Authors UMA and KJA gave the study concept and design, and drafted the manuscript. Authors HA, SS, MMS and AHI gave the study concept and design, and performed data collection, analysis and interpretation. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Healthcare providers have been identified as the most common vehicle for transmission of hospital acquired infections (HAIs) from patient to patient and within the healthcare environment. Large proportions of the infections acquired in the hospital are attributed to cross contamination and transmission of microbes from hands of healthcare providers (HCPs) to patients. Hand hygiene has been identified as the single most important, simplest and least expensive means of preventing HAIs. This study aimed to determine the knowledge, attitude and practice of hand hygiene among healthcare providers in semi-urban communities of Sokoto State, Nigeria.

Methods: A cross-sectional study was conducted among 144 healthcare providers selected by a multistage sampling technique. Data were collected with a set of pretested self-administered, semi-structured questionnaire. Data were analyzed using IBM SPSS version 20 statistical package.

Results: The mean age of the respondents was 32.1 ± 7.4 years, and majority of them were aged 20 – 39 years (81.2%), females (59.0%) and married (65.3%). Most of the respondents (71.5%)

*Corresponding author: Email: drangoos@yahoo.com;

were community health extension workers (CHEWs) and nurses/midwives. One hundred and thirty-two (91.7%) of the 144 respondents had good knowledge of hand hygiene; but about a third of respondents (31.9%) had the misconception that hand washing should be done before touching patients' files. Most of the respondents demonstrated positive attitude to hand hygiene. Most of them would attend workshop/training on hand hygiene (95.1%), and would advise their colleagues to do so (94.4%). One hundred and thirty-nine (96.5%) of the 144 respondents reported observing hand hygiene practices; of these, only two-thirds, 97 (69.8%) do so consistently. The main reasons cited for not observing hand hygiene practices consistently were unavailability of soap (88.1%) and irregular water supply (51.0%).

Conclusion: Although, knowledge, attitude and practice of hand hygiene were good among the respondents in this study, unavailability of soap and lack of constant water supply remain major constraints. Government and other stakeholders should provide adequate water, and materials for sanitation and hygiene in the healthcare facilities.

Keywords: Knowledge; attitude; practice; hand hygiene; healthcare providers.

1. INTRODUCTION

Considering the tremendous advancement in medical care in the past few decades, it is strange that the healthcare settings still remain unsafe for patients worldwide, principally as a result of hospital acquired infections (HAIs) [1]. Healthcare providers (HCPs) have been identified as the most common vehicle for transmission of HAIs from patient to patient and within the healthcare environment [2]. Large proportions of the infections acquired in the hospital are attributed to cross contamination and transmission of microbes from hands of HCPs to patients [3]. Numerous infections are still acquired from both patients and HCPs through poor hand hygiene, unsafe use of injections, medical devices and blood products, inadequate surgical procedures and deficiencies in medical waste disposal [4]. In addition to these factors, an unfavorable social background and population largely affected by malnutrition and other types of infections and/or diseases contribute to the increased risk of HAIs in developing countries [5].

Multidrug-resistant pathogens are commonly involved in such infections and render effective treatment difficult [6]. Prevalence studies of HAIs in the developing countries have reported higher rates than in the developed countries [7]. The total number of hand exposures in a hospital may range from several tens to thousands per day [7]. With each hand-to-surface exposure, a two directional exchange of microorganisms occurs between hands and the touched object and the transient hand-carried flora is thus continuously changing [8]. It has also been found that a substantial proportion of the healthcare workers' hand flora gradually gets replaced by pathogenic

microorganisms, which can spread throughout a health care environment in a short span of time [8].

Hospital acquired infections pose a very real and serious threat to all who are admitted in the hospitals [9]. According to the World Health Organization (WHO), HAIs affect an estimated 1.4 million patients at any time worldwide [10]. Hand hygiene has been identified as the single most important, simplest and least expensive means of preventing HAIs [6]. It is the practice which keeps the hands free from pathogens, or decreases the quantity of pathogen, prior to any procedure or touching the patient [11].

Evidence from studies has shown that improved hand hygiene has substantially reduced nosocomial infections and cross-contamination of multi resistant infections in hospitals [3]. It has also been shown to be associated with significant decrease in overall rates of HAIs and respiratory infections in particular [12]. Hand hygiene in the health care setting has been encouraged for generations and has been identified as the single most important intervention for preventing the transmission of infections [8]. Specifically, hand washing is recommended before and after every contact with patient to break the chain of infection [13]. Even though evidenced based guidelines for HCPs hand hygiene practices exist in many healthcare facilities, compliance with these are internationally low [14]; hand hygiene compliance rates among HCPs rarely exceeds 50% [9].

While lack of awareness and scientific knowledge regarding hand hygiene is believed to be a significant factor that could lead to inappropriate hand hygiene practices [15],

misconceptions regarding hand hygiene are believed to contribute to low compliance; for instance, when gloves are used as an alternative to hand hygiene, or the notion that skin irritation arises from frequent hand hygiene practices [16]. Other factors that have been found to contribute to poor hand hygiene practices in the healthcare settings include increased workloads due to under-staffing, lack of organizational commitment to good hand hygiene practices, and inadequate or lack of hand hygiene products and facilities such as running water, sinks, antiseptic or non-antiseptic soaps, alcohol hand-rubs and hand paper towels [17]. It has been found that most of the wards in the Nigerian hospitals lack adequate facilities for effective hand hygiene practices, and with the 'bowl-and-bucket method' being used as an alternative to running water [18].

Variations in the practice of hand hygiene across the hospital wards and among the different cadres of HCPs have been found to be associated with good knowledge of hand hygiene [19]. Also, while previous studies across the globe including Nigeria and Egypt reported positive attitude towards hand hygiene by an overwhelming majority of healthcare providers [12,20], widely varied and lower proportions of healthcare providers showed good knowledge of hand hygiene [21,22], and/or engaged in appropriate hand hygiene practices [13,23]. In the developing countries of sub-Saharan Africa, while a larger proportion of the populations reside in the semi-urban and rural areas, the healthcare facilities and manpower are concentrated in the urban areas [24]. The disproportionately high workload in the poorly equipped healthcare facilities in the semi-urban and rural areas therefore make full compliance with hand hygiene practices the only feasible means of preventing nosocomial transmission of infections in these facilities. Although, several studies regarding knowledge, attitude and practice of hand hygiene have been conducted among healthcare workers in Nigeria, most of them were isolated studies conducted in the tertiary healthcare facilities which are majorly situated in the urban cities across the country [12,21,25,26]; and there is a dearth of literature on the knowledge, attitude and practice of hand hygiene among healthcare workers in the lower levels of care obtainable in the semi-urban and rural areas of the country. This study was conducted to assess the knowledge, attitude and practice of hand hygiene among healthcare providers in semi-urban communities of Sokoto State, Nigeria. The findings would be invaluable

in designing strategies for promoting compliance with appropriate hand hygiene practices among healthcare providers; and in preventing HAIs in the healthcare facilities.

2. MATERIALS AND METHODS

This cross-sectional descriptive study was carried out among healthcare providers in health facilities in Wamakko Local Government Area (LGA) of Sokoto state, Nigeria, in November and December 2016. All healthcare providers in the government owned health facilities in Wamakko LGA were considered eligible for enrollment into the study. The sample size was estimated at 144 using the Fisher's formula for calculating the sample size for descriptive studies [27], a 90.0% prevalence of compliance with WHO guideline regarding practice of hand washing with soap and water from a previous study [28], precision level of 5%, and an anticipated 95% response rate. The eligible participants were selected by a 2-stage sampling technique. At the first stage, one health facility was selected from each of the 11 political wards in Wamakko LGA by simple random sampling using the balloting option. At the second stage, eligible participants were selected in each of the selected health facilities (in direct proportion to the number of staff in the respective health facilities) by systematic sampling technique using the staff list in the respective health facilities to constitute the sampling frame.

A semi-structured, self-administered questionnaire was developed and used to obtain information on respondent's socio-demographic characteristics, and knowledge, attitude and practice of hand hygiene. The questionnaire was reviewed by senior researchers in the department to ascertain content validity. It was then pretested on 15 healthcare providers at Yar-Akija Primary Healthcare Centre, Sokoto-South LGA of Sokoto State, Nigeria. Some questions were rephrased for clarity based on the observations made during the pretesting. Four final year medical students and two medical records staff assisted in questionnaire administration after pre-training on conduct of survey research, the study objectives, and questionnaire administration. Ethical clearance was obtained from the Ethical committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission to conduct the study was obtained from the administration of Wamakko LGA, while informed written consent was also obtained from the participants before data collection.

Data were analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 20. Respondents' knowledge of hand hygiene was scored and graded on a 13-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of '0' and a maximum score of '13' points. Those that scored greater than 50% of the maximum knowledge score (i.e., ≥ 7 of 13 points) were considered as having 'good' knowledge, while those that scored less than 50% of the maximum knowledge score (i.e., < 7 of 13 points) were graded as having 'poor' knowledge [29]. Frequency runs were done for further editing and cleansing of the e-data. Frequency distribution tables were constructed; and cross tabulations were done to examine relationship between categorical variables. Chi-square and Fisher's exact tests of independent association was used to test for relationship between categorical variables. All levels of significance were set at $p < 0.05$.

3. RESULTS

3.1 Socio-demographic Characteristics of Respondents

All the 144 questionnaires administered were retrieved and analyzed. The ages of the respondents ranged from 18 to 57 years (mean = 32.1 ± 7.4 years), and majority of them were aged 20 – 39 years (81.2%), females (59.0%) and married (65.3%). Most of the respondents were Muslims (77.1%), and also were community health extension workers (CHEWs) and nurses/midwives (71.5%) by cadre. The majority of respondents have practiced for 5 years and above (55.6%) as shown in Table 1.

3.2 Respondents' Knowledge of Hand Hygiene

One hundred and thirty-two (91.7%) of the 144 respondents had good knowledge of hand hygiene. A majority of the respondents (74.3%) knew hand hygiene to mean washing hand with soap and water or sanitizer before and after touching a patient; and most of them (89.6%) knew that it should be done consistently. Majority of the respondents knew the materials needed for hand hygiene and the moments to observe it. However, about a third of the respondents (31.9%) had the misconception that hand washing should be done before touching patients' files. Most of the respondents also knew

the hazards of a contaminated hand (93.1%) and the benefits of observing proper hand hygiene (97.9%) as shown in Table 2. There was no association between good knowledge of hand hygiene and any of the respondents' socio-demographic variables.

Table 1. Socio-demographic characteristics of respondents

Variables	Frequency (%) (n = 144)
Age group (in years)	
Below 20	3 (2.1)
20 -29	53 (36.8)
30-39	64 (44.4)
40-49	20 (13.9)
50 and above	4 (2.8)
Sex	
Male	59 (41.0)
Female	85 (59.0)
Marital status	
Single	41 (28.5)
Married	94 (65.3)
Separated	5 (3.5)
Widowed	4 (2.8)
Religion	
Islam	111 (77.1)
Christianity	33 (22.9)
Cadre	
Doctor	19 (13.2)
Nurse/Midwife	49 (34.0)
Laboratory scientist	14 (9.7)
Community health extension Worker	54 (37.5)
Pharmacist	8 (5.6)
Working experience (in years)	
Below 5 years	64 (44.4)
5 years and above	80 (55.6)

3.3 Respondents' Attitude to Hand Hygiene

Most of the respondents demonstrated positive attitude to hand hygiene. Most of them would attend workshop/training on hand hygiene (95.1%), and would advise their colleagues to do so (94.4%). Most of them believed it is important to observe hand hygiene before and after touching a patient (93.1%), and would advise their colleagues to observe same (93.1%). Majority of the respondents (65.3%) believed there is need to wash hand with soap and water even if one has used a sanitizer (Table 3).

Table 2. Respondents' knowledge of hand hygiene

Variables	Correct response Frequency (%) (n = 144)
Meaning of hand hygiene	
Wash hand with soap and water or sanitizer before and after touching a patient	107 (74.3)
When to observe hand hygiene	
Always before and after touching a patient	129 (89.6)
Materials that are needed for hand hygiene	
Constant water supply	95 (66.0)
Soap	140 (97.2)
Hand sanitizer	123 (85.4)
Hand gloves	124 (86.1)
Moments to observe hand washing	
Before touching a patient	131 (91.0)
After body fluid exposure risk	131 (91.0)
After touching a patient	135 (93.8)
Before touching patient files	46 (31.9)
After touching patient surrounding	137 (95.1)
Contaminated hand can be a vehicle for transmitting infection between healthcare providers to patients	134 (93.1)
Proper hand hygiene can protect both the healthcare provider and the patient from contracting disease	141 (97.9)
Knowledge grade	
Good	132 (91.7)
Poor	12 (8.3)

Table 3. Respondents' attitude to hand hygiene

Variables	Frequency (%) (n = 144)
Would attend a workshop/training on hand hygiene if invited	137 (95.1)
Would advise colleagues to attend workshop/training on hand hygiene if invited	136 (94.4)
Believed it is important to observe hand hygiene before and after touching a patient	134 (93.1)
Would advise colleagues to observe hand hygiene before and after touching a patient	134 (93.1)
Believed there is need to wash hand with soap and water even if one has used a sanitizer	94 (65.3)

3.4 Respondents' Hand Hygiene Practices

One hundred and thirty-nine (96.5%) of the 144 respondents reported observing hand hygiene practices; of these, only two-thirds, 97 (69.8%) do so consistently. Majority of the respondents (87.8%) reported observing hand hygiene practices before and after attending to patients; and the most commonly used materials were soap, water and sanitizers (71.3%). Although, less than a half of the respondents (44.6%) observe hand hygiene practices before putting on gloves, most of them (93.5%) do so after

removing gloves (Table 4). The main reasons cited for not observing hand hygiene practices consistently were unavailability of soap (88.1%) and irregular water supply (51.0%) as shown in Table 5.

4. DISCUSSION

The respondents in this study were of a relatively young population with a mean age of 32.1 ± 7.4 years, and majority of them (81.2%) were between the ages of 20 and 39 years. This could be due to the fact that close to half of them (44.4%) were newly recruited and have spent

Table 4. Respondents' hand hygiene practices

Variables	Frequency (%)
Observe hand hygiene practices while attending to patients (n = 144)	
Yes	139 (96.5)
No	5 (3.5)
How often hand hygiene is observed (n = 139)	
Always	97 (69.8)
Occasionally	42 (30.2)
When hand hygiene is observed (n = 139)	
Before attending to patient only	8 (5.8)
After attending to patient only	9 (6.4)
Before and after attending to patient	122 (87.8)
Materials used for hand hygiene (n = 139)	
Water only	2 (1.4)
Water and soap	21 (15.1)
Hand sanitizer only	17 (12.2)
Water, soap and sanitizer	99 (71.3)
Observe hand hygiene before putting on gloves (n = 139)	
Yes	62 (44.6)
No	77 (55.2)
Observe hand hygiene after removing gloves (n = 139)	
Yes	130 (93.5)
No	9 (6.5)

less than 5 years in service. While this compares well with the age distribution of respondents in another study conducted in Nigeria [12], in which majority of the respondents were aged 25 to 34 years with a mean age of 31.3 ± 6.8 years, it differs from the finding in another study conducted in Ghana, that reported a much younger population, with majority of respondents between the ages of 20 and 29 years [23].

Table 5. Reasons for not observing hand hygiene practices consistently

*Reason(s)	Frequency (%) (n = 42)
Irregular water supply	20 (51.0)
Inconveniently located sink	11 (26.2)
Unavailability of hand sanitizer	17 (40.5)
Unavailability of soap	37 (88.1)

**Multiple responses allowed*

Majority of the respondents in this study (59.0%) were females, this could be due to the fact that community health extension workers (CHEW), and nurses/midwives constitute a majority of respondents (71.5%), and these professions are generally considered to be women professions. Most of the respondents in this study (91.7%)

demonstrated good knowledge of hand hygiene. This finding is in consonance with the findings in studies conducted in tertiary healthcare facilities situated in urban areas including Lagos University Teaching Hospital, Lagos, Nigeria [12], and a Multispecialty Hospital in India [22] that reported 83.0% and 90.0% prevalence of good knowledge of hand hygiene respectively. The good knowledge of hand hygiene among most of the respondents in this study and other studies conducted in different populations across Nigeria could be due to the mass awareness campaign on hand hygiene that was carried out across the country following the recent outbreak of Ebola Virus Disease (EVD). Reports from studies conducted in different populations across Nigeria showed significant improvement in knowledge and practice of hand hygiene after the EVD outbreak as compared to before the outbreak [30,31].

Most of the respondents in this study showed positive attitude towards hand hygiene as they were willing to attend training workshop on hand hygiene (95.1%), and also encourage their colleagues to do so (94.4%). They also considered observing hand hygiene before and after touching a patient to be important (93.1%)

and would advise their colleagues to do so (93.1%). These findings compare well with the findings in studies conducted in Nigeria, Egypt and Italy, that reported 96.7%, 96.0% and 86.2% prevalence of positive attitude towards hand hygiene respectively [10,12,20].

Although, an overwhelming majority of the respondents in this study (96.5%) observed hand hygiene practices, only about two-thirds (69.8%) do so consistently; and this is similar to the 67% prevalence of compliance with hand hygiene practices reported in another study conducted in Ghana [23]. The barriers to compliance with good hand hygiene practices included unavailability of soap (88.1%), and lack of constant water supply (51.0%). Similar obstacles to the practice of hand hygiene were also reported in the study conducted in Ghana [23]. These findings corroborate the submission by the World Health Organization on the appalling state of water, sanitation and hygiene (WASH) services in health care facilities in low- and middle-income countries [32], and they re-emphasize the need for governments and other stakeholders to make provision of adequate water and materials for sanitation and hygiene in the health care facilities a top priority.

5. LIMITATION OF THE STUDY

The main limitation in this study is deliberate misinformation by the study subjects regarding their hand hygiene practices, as the data obtained was based on self-reported practices instead of direct observation.

6. CONCLUSION

Although, knowledge, attitude and practice of hand hygiene were good among the respondents in this study, unavailability of soap and lack of constant water supply remain major constraints. Government and other stakeholders should provide adequate water, and materials for sanitation and hygiene in the healthcare facilities.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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